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ABSTRACT

This conceptual paper uses two literatures--the work examining the development of expertise in reading comprehension processes and the work on effective approaches to instruction--to build an instructional model for teaching reading comprehension strategies. The report assumes a constructivist view of both reading comprehension and social discourse. Thus, it views the "teacher as a text" and suggests that students build a model of meaning for the classroom instruction they encounter. The report closes with a set of nine rules of thumb for guiding the development of comprehension, including the following: (1) good reading strategies are as adaptable as they are intentional; (2) good reading instruction depends upon the creation of an environment that continually portrays the usefulness and value of reading; and (3) both reading comprehension and comprehension instruction are highly interactive and reciprocal. One table illustrating the interactive view of reading comprehension is included; 149 references are attached. (Author/RS)

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Technical Report No. 512

DEVELOPING EXPERTISE IN READING COMPREHENSION: WHAT SHOULD BE TAUGHT? HOW SHOULD IT BE TAUGHT?

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Abstract

This conceptual piece uses two literatures—the work examining the development of expertise in reading comprehension processes and the work on effective approaches to instruction—to build an instructional model for teaching reading comprehension strategies. It assumes a constructivist view of both reading comprehension and social discourse. Thus, it views the "teacher as a text," and suggests that students build a model of meaning for the classroom instruction they encounter. The report closes with a set of rules of thumb for guiding the development of comprehension.

DEVELOPING EXPERTISE IN READING COMPREHENSION: WHAT SHOULD BE TAUGHT? HOW SHOULD IT BE TAUGHT?

There was a time when some educators believed that reading comprehension had to be "caught rather than taught." Teaching phonics and word identification processes was possible and desirable, but after that native intelligence and experience determined the degree to which comprehension could take place (see Pearson & Johnson, 1978, for a discussion of this view). Research conducted over the last decade has persuaded most reading educators that reading comprehension can be taught, either by setting up learning conditions in the classroom so that growth in comprehension is enhanced or by teaching strategies for coping with text directly and explicitly.

The purpose of this report is to present a sensible, rational plan for teaching comprehension that is based upon the best available evidence for what to teach and how to teach it. To identify this evidence, we have reviewed the research on teaching reading comprehension conducted over the last decade. From this review, we have distilled the major findings and themes and derived a set of guidelines for what to teach and how to teach it. The report contains three major sections. In the first section, we address the question of what to teach through a review of the literature about the comprehension strategies that expert readers use. In the second section, we answer the question of how to teach comprehension by focusing upon research from the recent research on teaching. In the third section, we present an exposition of the key elements in our plan, a set of "rules of thumb" to guide comprehension instruction in our classrooms.

The Comprehension Curriculum: What Should Be Taught?

Our Skills-Based Curriculum Tradition

Few would argue with the observation that the current comprehension curriculum is dominated by the teaching of specific skills. Even with the recent rise in popularity of whole language and literature-based reading programs, teachers in most American classrooms continue to use basal reading programs. Even the most avant-garde of the 1990 editions of basals reveal the vestiges of a discrete skills commitment. The sheer inertia of tradition seems to account for these skill sequences in basals; the best predictor of the skills of the 1990s basals is those that were taught it the 1980s basals and, most likely, tested in the commercially available tests of the 1980s.

Of course, there was not always a tradition to build from in establishing a scope and sequence of skills. The history of basals and comprehension skills reveals that at any given point in time from the 1930s through the 1980s, the comprehension curriculum has reflected the generally accepted views of comprehension as a process. Prior to the 1940s, reading was often divided into recreational and work-type reading activity (see Smith, 1965, for a delightful treatment of the curriculum activity during this period). Recreational reading was to promote enjoyment; work-type reading, to learn new information. Basal reading programs of this era reflected these distinctions. Under the general categories of recreational and work-type reading in basal programs were listed skills such as silent reading, oral reading, comprehension, and the skillful use of books, libraries, and other sources of information (Smith, 1965).

During the 1940s, a number of important sociocultural developments and a renewed interest in reading research led basal program developers to undertake extensive revisions, culminating eventually in the skills-based curriculum currently used (Smith, 1965). During this period, F. B. Davis (1944) conducted his classic study to determine the unique components of reading comprehension. Davis's finding that a large number of presumably independent skills ultimately resolved themselves into three factors (a word meaning factor, a gist factor, and a reasoning factor) did not stop reading educators from expanding their schemes of essential comprehension skills. Other educators during this period (e.g.,

Gans, 1940; Crossen, 1948) and even later (Betts, as cited in Smith, 1965; Smith, 1963; Spache, 1965; and Williams, 1959) attempted to determine which comprehension skills were essential.

It was also during this period that authors of basals first broke down the term *comprehension* into specific subcategories of comprehension skills, for example: skills needed to use an expanded vocabulary, locate information, select and evaluate materials, organize materials, retain information, develop speed in comprehension. In a given basal program, each of these skills was often further decomposed into more specific subskills.

With the publication in the 1950s of Russell's *Ginn Basic Readers* (1951), an important and lasting organizational device, *vertical arrangement*, arrived on the scene. Beginning in this period basal programs were planned *horizontally* within grade levels and *vertically* across grade levels to ensure continuity in skill development throughout the elementary grades (Smith, 1965). This construct also brought with it the inauspicious beginning of the now omnipresent scope and sequence of skills as the backbone of a reading series.

Over the next three decades, the field of reading witnessed expansion and refinement of the various skills considered important to reading comprehension. Reading researchers continued to try to discover the "real" skills involved in reading comprehension (e.g., Davis, 1968; Schreiner, Hieronymous, & Forsyth, R., 1969), and to focus increasing attention on higher cognitive skills (Wolf, Huck, King, & Ellinger, 1967). These concerns were reflected in attempts at building new basals (see *Sheldon Basic Readers, Macmillan Readers*, cited in Smith, 1965).

Thus, history documents two forces at work, both of which affected the comprehension curriculum: (a) the reevaluation, refinement, and expansion of basal reading programs based on current research and thinking about the reading process, and (b) the proliferation of comprehension skills as we know them today. These skills have grown to become the comprehension curriculum itself.

One does not have to wait until the 1970s and 1980s to find critics of the discrete comprehension skills curriculum. In 1959 Sochor summarized the problem with researchers' understanding of critical reading skills in particular and reading in general. She also foreshadowed what was needed to understand the reading process and to change the comprehension curriculum.

> Much of the variability in what constitutes . . . reading is due to insufficient research evidence on the reading abilities themselves and on basic and related factors which might contribute. Research workers have been unable to clarify sufficiently the nature, independence or difficulty levels of comprehension abilities in reading. Consequently, those concerned with reading abilities resort to logic for a definition of . . . reading. (pp. 47-48)

Sochor's comments help explain the proliferation of reading comprehension skills in textbooks, journal articles, and basal reading programs over the last 40 years. What has been taught has been the comprehension skills that were *believed* to be the most important.

Since 1975, however, researchers and educators have reached a new understanding about reading in general and about the comprehension process in particular. This new understanding has led to a different view of comprehension and an accompanying shift in our views about how to teach it. We no longer think of reading comprehension as a series of discrete skills that can be summed to achieve comprehension ability. Instead, we see comprehension as a complex process involving interactions between readers and texts in various contexts for various purposes (e.g., Lipson & Wixson, 1986).

A Schema-Theoretical View of the Reading Process.

The most popular example of an interactive view of reading comprehension is derived from schema theory (Anderson & Pearson, 1984). Differing sharply from a skills-based view of comprehension, this view conceptualizes reading as an active process of constructing meaning by connecting old knowledge with new information encountered in text. Readers build meaning by engaging in a series of recursive interactions. In each interaction, readers generate a model that provides the best possible fit with the data perceived to be coming from the text. New textual data provide an invitation to reconsider the adequacy of the model; new information is either made to conform to the existing model, or it prompts a revision of the model. Gradually, iteration by iteration, readers construct their own meaning. That meaning probably resembles the meaning the author had in mind in setting pen to paper. But no reader will develop the same model as the author, nor will any two readers ever develop exactly the same model. Each of us prints a unique personal stamp on every act of reading we create.

This interactive view of reading comprehension can be illustrated through profiles of readers of various abilities. First, let's look at readers of different levels of expertise as they read and comprehend the same text (see Table 1).

[Insert Table 1 about here.]

All of these readers, novice to expert, use many similar strategies to comprehend the given text. Emily, the expert adult reader, has a wealth of knowledge to bring to the text. She uses that knowledge to connect and render meaningful new information in the text. She uses her knowledge to develop a tentative model of what the text means. Her thinking reflects this continuous and recursive interaction between textual information and existing knowledge, or transaction between text and reader (Rosenblatt, xx).

The two novice readers, Gary and Albert, also actively construct meaning. Like Emily, they make extensive use of their background knowledge to comprehend new textual information. Gary, the good fifth-grade reader, also asks himself questions to help monitor his reading—an effective strategy to make sense out of text. Even Albert, the average fourth-grade reader, uses his knowledge to draw many important inferences from the text.

A few distinctions, however, can be made between the expert and novice readers. First, Emily is better able to distinguish between important and unimportant information, although Gary does seem to differentiate successfully the important information in his summary. Second, Emily demonstrates an awareness of her comprehension of the text. She comments, "Okay, now I get it," indicating that she is monitoring her own understanding. She also says, "That's what I expected," indicating awareness that she has confirmed her hypothesis. So Emily not only uses effective strategies to comprehend the text but also to monitor that comprehension. Gary shows some signs of monitoring (the self-questions), but Albert does not overtly mention, and indeed may not be aware of, his own understanding.

Toward a Model of a Thoughtful, Expert Reader

This schema-theoretically based view of comprehension has been the underlying basis of much of our recent work on comprehension processes employed by expert readers, comparative work on factors that discriminate the expert from the novice reader, and instructional research designed to foster or improve comprehension ability. From this work, we have learned much about what expert readers do when they read, what it is that novice readers do not do, and what needs to be done to help novices work toward expertise. We have learned, for example, that active, expert readers . . .

- constantly search for connections between what they know and what they encounter as new information in the texts they read.

- constantly monitor the adequacy of the models of text meaning that they build.
- take steps to repair faulty comprehension once they realize they have failed to understand something.
- learn very early on to distinguish important from less important ideas in the texts they read.
- are especially adept at synthesizing information within and across texts and reading experiences.
- make inferences during and after reading to achieve a full, integrated understanding of what they read.
- sometimes consciously, almost always unconsciously, ask questions of themselves, the authors they encounter and the texts they read.

These are the characteristics of active, thoughtful, expert readers. It is our contention that it is these traits derived from the research of the past 15 years, that should drive our search for a comprehension curriculum. To develop truly thoughtful readers, we must ensure that they possess these characteristics.

Thoughtful readers use existing knowledge to render texts sensible. While reading, thoughtful readers use prior knowledge constantly to evaluate the adequacy of the model of meaning they have built up to a particular point in their reading. This is true for readers of all ages or levels of sophistication. Recall from Table 1 how both Emily and Gary used their general world knowledge as they read and interpreted the Markham passage--Emily immediately recalled knowledge about Africa 50 years ago, Gary used his prior knowledge about airplanes to extend and elaborate what he read about planes with one engine and no radio.

Thoughtful readers also use their existing knowledge when they have to demonstrate to others that they have understood what they have read. They use it to determine what is important in a text, to draw inferences (inferences, in fact, are almost completely reliant on prior knowledge), or to generate questions we might have about a text.

Research with adults and children and with experts and novices points to the same general conclusion. New information is learned and remembered best when it is integrated with relevant prior knowledge, or existing schemata. Existing schemata form frameworks that serve as organizing structures for incorporating new information (Anderson, Spiro, & Anderson, 1978). And, as we shall later demonstrate, these findings hold whether the knowledge is accurate or inaccurate: misconceptions are schemata too (in fact, they are often incredibly well-developed, resistant, and resilient schemata)! In addition, studies have demonstrated that:

1. Students with higher prior knowledge comprehend and remember more (Brown, Smiley, Day, Townsend, & Lawton, 1977; Pearson, Hansen, & Gordon, 1979).
2. But, merely having prior knowledge is insignificant for comprehension improvement; the knowledge must be activated, implying, of course, a strong metacognitive dimension to its use (Bransford & Johnson, 1972; Dooling & Lachman, 1971).

3. Young readers and poor readers often do not activate their prior knowledge (Paris & Lindauer, 1976).

4. Good readers use their prior knowledge to determine importance in text (Afflerbach, 1986).

5. Good readers use their prior knowledge to draw inferences and make elaborations in text (Gordon & Pearson, 1983; Hansen, 1981; Hansen & Pearson, 1983).

What kinds of knowledge do good readers use to help them comprehend and remember? Resnick (1984) argued that they use three kinds of prior knowledge: (a) specific knowledge about the topic of the text, (b) general world knowledge about social relationships and causal structures, and (c) knowledge about the organization of the text.

A number of studies have been conducted over the last 10 years to demonstrate how prior knowledge facilitates comprehension. In a series of studies reported by Bransford, Vye, and Stein (1984), good and poor fifth grade readers were asked to identify anomalous information in text and then to generate elaborations of segments of text to help them improve their recall. Good readers were successful at identifying anomalous information and at creating helpful elaborations. Poor readers, on the other hand, could not identify anomalous information. Their responses suggested that they attended to surface rather than deep structure features of the text. For example, good readers could explain why the sentence, "The strong man helped the woman lift the heavy piano" is easier to remember than, "The strong man wrote a letter to his friend." Poor readers thought the second sentence was easier because it was shorter. Poor readers could be taught, however, to use their general world knowledge to identify anomalous information and to generate elaborations that helped them remember better. To do this, poor readers need to be taught that they already have ideas in their heads, and that they can use those ideas to help them understand what they read.

The past few years have witnessed a growing interest in misconception research. Several studies in reading (Alvermann, Smith & Readence, 1985; Maria & MacGinitie, 1982) and in science education (Dole & Smith, 1987; Eaton, Anderson, & Smith, 1984; Roth, 1985) have demonstrated that when students have inaccurate knowledge, it can often overwhelm information in the text or even instruction designed to overcome the misconceptions (Anderson & Smith, 1987). Anderson (1977) has argued that students are not likely to change their existing ideas or schemata unless they recognize that their current schemata no longer provide an adequate account of the data they gather in everyday experience, *and* they can see a way out of their difficulty.

But students can overcome misconceptions. Roth (1985) was able to help students change their ideas by giving them specially prepared text that confronted and dealt with students' inappropriate schemata about photosynthesis, specifically pointing out why such inappropriate views are inadequate. Dole and Smith (1987) developed an effective instructional intervention that also appeared to help students change their schemata. They asked students to identify their prior knowledge about scientific topics before reading about those topics. Students wrote down their own ideas and then compared them to the ideas found in the science textbooks. They then discussed whether their ideas were the same or different from scientists' ideas. This strategy proved effective in helping students change their inappropriate schemata and develop scientifically accurate schemata.

Certainly an impressive body of research points to the importance of prior knowledge in text comprehension. Research clearly indicates that good readers use prior knowledge to help them make sense of text and that poor readers often do not. Poor readers can be taught to use, and even alter, their prior knowledge; when they learn to put it to use, their comprehension improves. Prior knowledge

is so pervasive and so important, one can only wonder why it traditionally has received so little curricular attention as a specific training strategy.

Thoughtful readers monitor their comprehension throughout the reading process. If prior knowledge is the "stuff" of comprehension, monitoring is the primary mechanism readers use to accomplish sense making. Intuitively, we have always known that good readers are more careful in their reading than are poor readers. First, they are more aware of how well or poorly the reading is going. Recall that Emily remarks, "Okay, now I get it," indicating her awareness that comprehension has clicked in. Second, good readers are also better able to alter their reading strategies to compensate for a problem once they realize that one exists; in other words, they have a wider range of fix-up strategies.

Poor readers, by contrast, tend to be much less aware of problems when they do exist and are less able to compensate even when they are aware. For example, in the example in Table 1, Albert doesn't seem to be aware of his lack of overall understanding. The long-standing intuitions of teachers about good and poor readers' monitoring have been corroborated by a host of research studies completed in the last 15 years under the general rubric of metacognition (for excellent summaries of this type of work, see Baker & Brown, 1984; Garner, 1987; Garner, in press; or Wagoner, 1983).

In a typical comprehension monitoring study, subjects are given text that contains something that doesn't make sense. This anomalous information can be inconsistent either with what is true about the world (e.g., elephants can fly) or with what is stated in another part of the text (e.g., in one sentence it states that John lived on Green Street and in another, that he lived on Brown Street). Furthermore, the anomalous information can come from domains of knowledge that are known to people of all ages (e.g., animals that fly or simple rules of gravity) or obscure domains of knowledge (e.g., the effect of heat on metal magnetism or the habits of light-emitting animals in the sea). The subject's task is to recognize and report the inconsistency. Using a wide range of tasks and texts, researchers have found that the ability to detect inconsistencies varies as a function of both age and ability (see Garner, 1987, for a careful analysis of this work). Interestingly, students seem to develop a nonverbal awareness of anomalies before they are able to report them. In at least three studies (Flavell, Speer, Green, & August, 1981; Harris, Kruithof, Terwogt, & Visser, 1981; Patterson, Cosgrove, & O'Brien, 1980), even students who were unable to report certain anomalies spent more time reading the sections of the text containing them than they did reading sections without anomalies.

Metacognitive ability does not seem to follow a purely developmental pattern (i.e., as you get older, you get more of it or better at it). Vosniadou, Pearson, and Rogers (1988) found that three different factors—mode of presentation, topic familiarity, and textual explicitness—had differential influences upon the ability of students of different ages to detect inconsistencies. Third-grade students were better able to detect inconsistencies when listening to a story than when reading it. When the topic was familiar, even first-grade children were able to detect inconsistencies. When it was unfamiliar, first-grade children were unlikely to detect the inconsistency even when it was explicitly contradicted in another part of the text. However, for older children (third and fifth grade), inconsistency detection for unfamiliar topics was enhanced when the anomaly also contradicted a previous statement in the text.

Notice that the typical comprehension monitoring study imposes roadblocks to comprehension by putting readers into a situation in which they are forced to read texts with anomalies embedded. This presents problems of ecological validity for all comprehension monitoring studies using this error detection paradigm; in real reading, people seldom encounter intentional anomalies (good writers, in fact, strive to avoid them). For most of us, what we read becomes anomalous only when we lack the knowledge necessary to understand a text or when we are victims of a gross misconception. For novice readers (and occasionally for expert readers) additional anomalies arise when they misread words or phrases and become aware of an inconsistency between what they misread and what came before or after.

Fortunately, a few studies have addressed the comprehension monitoring phenomenon using normal texts. Revelle, Wellman, and Karabenick (1985) studied preschoolers' reactions to requests to undertake

certain actions in a play (sandbox and pretend tea party) environment. Even in young children, they found a wide variety of reactions (most of them requests for clarification or additional information) to experimenter requests that posed varying degrees of comprehension problems for the children. Additionally, the children, through their behavior and by the number and type of requests they made for clarification, demonstrated that they were able to discriminate between experimenter requests that posed problems and those that did not. The Palincsar and Brown (1984) instructional study on reciprocal teaching (see the later sections of this report on synthesizing and question asking) required students to seek clarification of hard parts of the passages (which were taken from commonly used expository materials) they read. Students were able to engage in discussions about what parts of the text were difficult for them; however, this activity of clarifying text was the most difficult of the four strategies for the students to complete on their own. Also on the positive side, when lessons on comprehension monitoring have been included in larger "metacognitive" training programs (Duffy et al., 1987; Paris, Cross, & Lipson, 1984), elementary students have improved their ability to apply these strategies to their reading.

Despite concerns about the genuine character of error detection tasks (Winograd & Johnston, 1982), there is considerable reason and evidence for us to take the development of comprehension monitoring strategies seriously. First, the evidence that it distinguishes the expert from the novice is clear. Second, comprehension monitoring is amenable to instruction. Third, it matches our intuition about what good readers ought to be able to do. Fourth, it goes hand in glove with another, and what may be the more important, characteristic of the thoughtful reader—regulating or repairing comprehension once a problem has been detected.

Thoughtful readers repair their comprehension once they realize it has gone awry. Comprehension repair has acquired a host of aliases: regulation strategy, repair strategy, fix-up strategy. By whatever name, it is critical to expert reading. Good readers know what to do when they find that they no longer comprehend. They know what to do when comprehension fails. They anticipate that problems will arise and they take action to solve them when they do.

Unfortunately, the evidence to support comprehension repair as a key characteristic of the strategic reader is not as plentiful as is the evidence for comprehension monitoring. In fact, Baker and Brown (1984) bemoaned the lack of progress on this dimension (they called it regulation) of metacognitive development. There are, however, some classic fix-up strategies that distinguish the expert from the novice reader (see Garner, 1987, for a complete summary).

First, good readers tend to be more flexible in their allocation of study time than poor readers. Masur, McIntyre, and Flavell (1973), found that given a direction to memorize a set of difficult drawings, older students adopted a much more efficient and adaptive strategy from one trial to the next than did younger students. The younger students tended to use the same approach from one trial to the next, whereas the older students tended to focus upon those they had missed from the previous trial. Working on a similar problem of managing resources, Owings, Peterson, Bransford, Morris, and Stein (1980) obtained similar results. When students were given an opportunity to study two stories that they knew were of differing levels of difficulty (they had previously rated the stories for difficulty themselves), the better students studied the more difficult story for a significantly longer period of time than the less difficult story. By contrast, the poorer students studied the two stories for approximately equal periods of time.

Second, experts are much more likely then novices to look back at the text to resolve a problem. In their classic study on lookbacks, Alessi, Anderson, and Goetz (1979) found that college students' knowledge deficits due to lacking or losing information could be almost completely restored with an induced lookback strategy. Garner and her colleagues (Garner & Reis, 1981; Garner, Macready, & Wagoner, 1984; Garner, Wagoner, & Smith, 1983) have investigated the lookback phenomenon extensively. The general conclusion to be drawn from their work is that there is a consistent positive relation between using the look-back strategy and reading comprehension (see Garner, 1987).

Third, experts are more flexible and adaptable than novices; they are much more likely than novices to use different strategies depending upon circumstances. Work by Raphael and her colleagues (Raphael & Pearson, 1985; Raphael, Winograd, & Pearson, 1980; and Raphael & Wonnacott, 1985) has consistently demonstrated a positive relationship between students' overall comprehension and their ability to learn to adapt question-answering strategies to the demands imposed by the question and the context in which it is asked. For example, given a choice between answering a question by going right to the part of the text that the question comes from, searching around the text to find a response that fits the question, and relying primarily on one's prior knowledge, Raphael (Raphael, et al., 1980) found that good readers are better able to adapt appropriate strategies than are poor readers. Second, she found that regardless of what they say they are going to do to answer a question, poor readers tend to be unilateral in their actual approaches to answering questions, with many pursuing little more than a simple text-matching or answer-grabbing (Pearson & Johnson, 1978) approach.

There is a sense in which fix-up strategies are really much more pervasive than we might recognize at first glance. Almost any skill worth teaching in a comprehension curriculum (and perhaps some not quite so worthwhile) are plausible candidates to use as regulatory or fix-up strategies when readers find themselves confronted by a comprehension problem. In other words, readers who, in the process of monitoring comprehension for sense, find themselves in trouble can resort to a deliberate search for main ideas or cause-effect relations or sequences of key events. They can consciously try to summarize, draw inferences, or ask themselves questions to improve the situation. Furthermore, it is highly likely, given the interactive and recursive nature of the reading process, that in any given regulatory attempt, readers will simultaneously invoke two or more of these strategies.

A productive way to think about traditional skills is as fix-up strategies. Usually, when reading is going well and we experience one after another after another click of comprehension, we are completely unaware of how we are processing the text. We are operating in an automatic processing mode. But when we realize that things are not going well, when we experience one of the "clunks" of comprehension, we shift from an automatic to a conscious control mode of processing. Then we may say to ourselves something like, "I've just read the last four pages and don't remember a thing: I'd better go back and look for some main ideas." This may be exactly where those specific skills and strategies that characterize our comprehension curricula are useful–as conscious strategies we call on when the going gets tough.

Thoughtful readers are able to determine what's important in the texts they read. Determining importance plays a critical role in the comprehension process. Because of this, determining importance has attracted considerable attention and research interest (Afflerbach & Johnston, 1986; Baumann, 1986; Cunningham & Moore, 1986; Williams, 1986a, 1986b), most often under the rubric of main idea.

Williams (1986b) and Winograd and Bridge (1986) argue that the instructional terminology for determining importance differs from one researcher to another and from one instructional program to another. Besides the ubiquitous term "main idea," Williams reported the use of the terms gist, topic, topic sentence, macrostructure, superstructure, summary, key word, thesis, theme, and interpretation. Regardless of the terminology used, it is clear that teachers spend considerable instructional time trying to help students determine the "main idea." We have consciously declined to use the term main idea in this report, opting instead for the phrase, determining importance. Our rationale is that separating the wheat from the chaff in a text is what really counts. Finding the main idea is merely one way to determine what's important.

How do we differentiate what's important from what's unimportant? Williams (1986b), Tierney, and Cunningham (1984), and Winograd and Bridge (1986) make a distinction between author-determined importance and reader-determined importance. For example, a study by Pichert and Anderson (1977) demonstrates reader-determined importance. They found that when different purposes are set for reading, readers selectively determine what's important. Readers who read an ambiguous passage from

the perspective of a home-buyer found different parts of the passage to be important than did readers who read the same passage from the perspective of a burglar.

Most, if not all, school-based reading, however, requires readers to determine author-based (i.e., text-based) importance. Good reader/poor reader studies have found consistently that good readers are better able to judge author-based importance than are poor readers (Afflerbach, 1986; Englert & Hiebert, 1984; Johnston & Afflerbach, 1985; Winograd, 1984). Winograd and Bridge (1986) and Afflerbach (1986) argue that good readers use three different strategies. First, good readers use their general world knowledge and domain-specific knowledge to allow partial access to the content of the text. For example, notice in Table 1 how Emily immediately activates her knowledge about Isak Dineson as she begins to read the Markham passage, then uses her knowledge about Africa to help her focus on the passage's content. She also demonstrates her understanding of the author's intentions when she develops her hypothesis about the topic of the paragraph after reading the first sentence. Second, good readers use their knowledge of text structure to help them identify and organize information. Text structure knowledge includes attention to key words, phrases, graphics, summarizing statements, and other surface-level cues. Emily, for example, demonstrates her knowledge of text structure by hypothesizing what the paragraph will be about based on surface cues in the first sentences. Lastly, adult proficient readers use their knowledge of author biases, intentions, and goals to help determine importance (Afflerbach, 1986).

Certainly a comprehension curriculum ought to include strategies for extracting important information from text. What we have in mind goes well beyond what has typically been included in main idea instruction. We advocate a broader view of the strategy, a new name for the strategy, and explicit instruction in extracting important information from text.

Thoughtful readers synthesize information when they read. A special case, or if you prefer, a logical extension of determining importance is the ability to synthesize information across larger units of text (or even between texts) to create summaries.

While there is substantial work supporting the usefulness of determining importance, there is probably even more work evaluating the usefulness of summarizing as a comprehension and studying strategy. We know that while even young children can synthesize the plot structure of simple narratives (such as folk tales), they have much greater difficulty with more complex tasks on the same stories, such as rating the importance of each section to the theme (Brown & Smiley, 1977; Brown, Smiley, & Lawton, 1978). With maturity, children become more adept at these more complex tasks (Brown & Smiley, 1977; Pichert, 1979), apparently because they become more aware of how texts are organized and of how to adapt their studying strategies so that they maximize the amount of time they spend studying information they had not previously learned (Brown & Campione, 1979). It is interesting to note that in the studies conducted by Brown and her colleagues (Brown & Campione, 1979; Brown, et al., 1978), sophisticated college students, given several study trials to try to remember information in a text, actually shifted their emphasis ever downward from text ideas that had been independently rated by experts as high to moderate to low in importance.

Perhaps the most crucial work in summarizing has followed a tradition started by Brown & Day (Brown & Day, 1983; Brown, Day, & Jones, 1983). Extending the text analysis work of Kintsch and van Dijk (1978), they identified five operations critical to creating summaries. They are:

1. Delete irrelevant information.

2. Delete redundant information.

3. Create a superordinate label for a list of things or actions (e.g., food for beef, carrots, pie, and salad).

4. Try to locate topic sentences for paragraphs and use them in your summary when appropriate.

5. Invent topic sentences when you are unable to locate them.

Noting that these rules are used freely by expert readers, Brown and Day (1983) set out to determine their use by novices. They found that average-ability fifth-grade students could perform all the deletion rules accurately. On the other hand, fifth graders never used the invention rule, indicating a strong tendency for developmental differences to appear more prominently with an increase in the complexity of the rule.

What is encouraging about these summarization operations is that they appear to be amenable to instruction. For example, Day (1980) was able to teach both regular and remedial community college students to apply the rules to improve the quality of their summaries. Subsequent studies by Hare and Borchardt (1984), Cunningham (1982), and Taylor and her colleagues (Taylor, 1982; Taylor & Beach, 1984; Taylor & Berkowitz, 1980) have evaluated similar summary training programs for high school and intermediate-grade students. In all the studies, effects for comprehension have been found, and in the Taylor and Beach study, effects for summarization training extended to both reading comprehension and writing activities.

While it is not exclusively a summarization strategy, it is worth noting that in the highly successful reciprocal teaching program of Palinscar and Brown (1984), summarization is an important part of the training students receive. In this program, students are taught to apply four strategies to any text they read: (a) summarize it, (b) ask a few questions that get at what is important in the text, (c) clarify any parts that proved difficult to understand when you were reading, and (d) predict what the author will talk about next. Although there is no way to determine the relative contribution of each of the four component strategies to comprehension improvement, it is useful to know that summarization is a part of this successful technique.

Thoughtful readers draw inferences constantly during and after reading. Drawing inferences is a skill commonly found in many basal reading programs. Based on the belief that only older children are able to draw inferences, some programs postpone the teaching of drawing inferences until the later elementary grades. But such delays seem both unnecessary and harmful to students. If we look at our least expert reader from Table 1, Albert, we can see that he continuously draws inferences as he reads, despite his lack of expertise in comprehending the overall meaning.

One of the most common findings of recent research on reading is that drawing inferences is an essential part of the ongoing comprehension process readers engage in (see Anderson & Pearson, 1984, for an extensive treatment of this phenomenon). Despite the persistent conventional wisdom that implicitly argues for delaying giving children inferential activities until they have mastered literal comprehension, both basic and applied research in reading clearly support a strong emphasis on inferential activities from the outset of instruction.

Inference is the heart of the comprehension process. Schemata serve as organizing frameworks to put pieces of information together. Readers and listeners use these frameworks to fill in omitted details and to make extensive elaborations (Anderson, 1977; Anderson, Spiro, & Anderson, 1978; Bransford, Barclay, & Franks, 1972; Brown, Smiley, Day, Townsend, & Lawton, 1977; Paris & Carter, 1973; Kail, Chi, Ingram, & Danner, 1977). For example, in the Kail et al. (1977) study, second and sixth graders read sentences such as: "Mary was playing in a game. She was hit by a bat." Although the game of baseball is never mentioned in these sentences, students had no difficulty drawing the inference that Mary was playing baseball. Even second graders could use their prior knowledge to infer that if Mary was hit by a bat in a game, she must have been playing baseball. These studies demonstrate that

children *can* draw inferences, not that children *will* always and automatically do so (see, for example, Paris & Lindauer, 1976). They also suggest that even the simplest of texts requires many inferences.

Second, instructional studies conducted by Pearson and his colleagues provide strong evidence that children as young as second graders can be trained to improve their inferencing abilities. Two instructional activities of interest were used for these studies. In the Hansen (1981) and Hansen and Pearson (1983) studies, experimenters told students how inferences are made. They helped students learn how to use their existing knowledge and information in the text to help them answer questions. In addition they gave students visual and kinesthetic reminders of how to use existing knowledge and text knowledge to draw inferences. In the studies by Raphael and her colleagues (Raphael & McKinney 1983; Raphael & Pearson 1985; Raphael & Wonnacott, 1985), students were asked to identify and label the strategies they used to answer comprehension questions, especially inference questions. They showed students that sometimes they could answer questions just from their prior knowledge, and that other times they needed to use information in the text as well as their prior knowledge. All of these strategies were effective in improving students' comprehension of text and in their ability to answer inferential questions.

Thoughtful readers ask questions. Teacher-generated questions have proliferated as a major comprehension activity in basal reading programs and also in American classrooms. But student-generated questions have not, although we have evidence that they should. Why would student-generated questions be useful to readers? One theoretical explanation is that the process of generating questions, particularly higher order questions, leads to deeper levels of processing text (Craik & Lockhart, 1972; also see Andre & Anderson 1978-79), thereby improving comprehension and learning.

In a quest to help students learn how to assume control over their own learning, several studies have tried to get students to generate their own questions. Results of these empirical research studies about self-questioning have been uneven. Tierney and Cunningham (1984) reported mixed and inconclusive results from studies attempting to teach students to ask their own questions. Nonetheless, two studies worth reporting are those conducted by Singer and Donlan in 1982 and Palincsar & Brown in 1984 (see also, Brown & Palincsar, 1985; and Brown, Palincsar & Armbruster, 1984).

In the Singer and Donlan study, high school students were taught to generate story-specific questions from a set of general questions along the lines of a well-developed story structure. Thus, students used a list of story structure questions (e.g., What does the leading character initiate?) to create their own more specific questions about the to-be-read text. Those students who generated their own questions improved their comprehension of stories more than students who simply answered questions constructed by their teachers. Apparently, the "active comprehension" of stories led to improved understanding of text.

The Palincsar and Brown (1984) studies provide additional strong evidence for the utility of student-generated questions. In a series of studies, they trained junior high students in four important learning strategies--summarizing, questioning, clarifying, and predicting. A very careful modeling in the form of a teacher-student dyad was established to train students how to ask good questions. They reported strong, impressive effects for their instructional intervention program. Of course, their intervention came in a packaged program including all four learning strategies rather than simply having students ask good questions. But there is good reason to believe that students' comprehension of expository materials can be improved with this type of approach.

A closer examination of these studies may answer the nagging question of why requiring students to generate questions is not always an instructionally effective technique. In the Singer and Donlan study and the Palincsar and Brown studies, students were trained carefully and given a set structure in which to work. Such training may be critically important to the effectiveness of question generation. Support for this argument comes from a study by Andre and Anderson (1978-79). In their study, students who

were trained in generating questions outperformed students who either generated questions on their own or merely reread the text. Students without training in generating questioning performed no better than students who simply reread the material.

Searching for a Comprehension Curriculum

The question of what a comprehension curriculum ought to look like is one of the most important in reading instruction today. It is especially important for those of us who would like to debunk the specific-skills myth to provide an alternative.

We propose that the strategies we identified in our review of the behavior of expert readers should form the basis of a comprehension curriculum for the 1990s. After all, these are learner strategies that have been shown to be important for readers as they move along the continuum of expertise from novice to expert readers. In addition we argue that the seven characteristics of the thoughtful reader we have identified and reviewed can be used to create our comprehension curriculum. These characteristics can be the goals that constitute the infrastructure of what we teach in the name of comprehension instruction. We repeat them here as a final summary of our search. Thoughtful readers, we have argued (and, we hope, demonstrated with convincing research) . . .

- constantly search for connections between what they know and what they encounter as new information in the texts they read.
- constantly monitor the adequacy of the models of text meaning that they build.
- take steps to repair faulty comprehension once they realize they have failed to understand something.
- learn very early on to distinguish important from less important ideas in the texts they read.
- are especially adept at synthesizing information within and across texts and reading experiences.
- make inferences during and after reading to achieve a full, integrated understanding of what they read.
- sometimes consciously, almost always unconsciously, ask questions of themselves, the authors they encounter, and the texts they read.

There is one essential characteristic of our suggested curriculum that distinguishes it from the comprehension skills curriculum in basal reading programs. A curriculum derived from the cognitively oriented research of the last decade would be better characterized as a *range* of flexible, adaptable strategies rather than a *scope and sequence* of skills. Traditionally, basal reading programs have discussed and taught various reading comprehension *skills*--main ideas, sequencing, cause and effect relationships, and the like. Within the more recent instructional research tradition, it is more common for researchers to discuss comprehension *strategies*. One reason for this preference is more political than substantive; researchers working within a cognitive framework may wish to avoid identification with the "reading as the assembly of a set of discrete skills" tradition. But there is a second and more important reason for the use of the term strategies instead of skills. In the current reading curriculum, comprehension skills are characterized as isolated activities in which students employ small pieces of texts, usually on workbook pages. For example, finding the main idea of a paragraph is sometimes taught through the repeated practice of reading short paragraphs and choosing from four possible main

idea statements. Or, if the skill is taught directly by teachers, they often tell students simply that "the main idea is the most important idea" (Hare & Bingham, 1986; Baumann, 1986).

Those who use the term strategy, however, have in mind something more than repeated practice or simple directives. Strategies refer to conscious and flexible plans that readers apply and adapt to particular texts and tasks. For example, when teaching students to find the main idea of a paragraph, teachers might model how they use a flexible plan for figuring out what's central to the content of particular paragraphs. They would implement the plan differently from one paragraph to the next, but there would be similarity across paragraphs. Those similarities would constitute the core of the lesson plan.

Several important differentiations, then, can be made between skills and strategies. First, strategies emphasize conscious plans under the control of the reader, whereas skills occur almost automatically and effortlessly. Readers, like the expert reader, Emily, make decisions about which strategy to use and when to use it. Second, strategies emphasize the reasoning process that readers go through as they comprehend text, while skills seldom involve self-conscious behavior. Third, strategies emphasize the adaptable nature of the comprehension process; the strategies readers use change when reading different kinds of text or when reading for different purposes. Skills, on the other hand, can note a consistent, invariant behavior.

One final point deserves explicit mention before we turn from issues of curriculum to issues of instruction. In opting for a loosely coupled "range" of strategies rather than a tightly knit scope and sequence of skills, we are asking teachers to completely rethink notions of skill mastery and instruction. We really do expect *all* readers of *all* ages to engage in *all* of these strategies at *some level of sophistication*. We are really arguing that there are no first-grade skills, third-grade skills, sixth-grade skills, and so on. Readers of all ages engage in, or should engage in, all of these strategies. With age and experience, they improve and they are able to apply them to a wider range of texts, tasks, and situations. But they are as important for the novice to experience as they are for the expert. Granted, first graders may not ask terribly sophisticated self questions, but they can ask something, and what they ask is likely to be important to them. What we have, then, is more of an emerging expertise model of strategy acquisition instead of a scope and sequence of skills. This distinction will become very important as we turn our attention to instruction and address the critical issue of how students develop these flexible strategies.

A Caveat

It is beyond our intention in this report to lay out a total reading comprehension program for the elementary grades, and we do not claim that our suggestions could or should be used exclusively and inclusively for such purposes. While we argue that readers of all age levels can benefit from the particular strategies included here, we are not suggesting that the comprehension curriculum should consist of only these strategies. We have left several important issues unaddressed. For example, we do not discuss what young and novice readers need to understand about the relationship between oral and written language. It is difficult to envision the direct teaching of this relationship. Children come to understand the relationship in different ways and at different times. An understanding of how talk relates to print often arises from whole language activities and language experiences where young children see their words translated into symbols. We would never want to argue, or even be construed as arguing, that such activities are not necessary if one chooses to follow our curricular guidelines.

Another worthwhile comprehension activity that we have not discussed is the directed reading lesson—a well-known and time-honored approach to teaching reading. We know from research that comprehension can be improved through a series of well-developed and thoughtful lines of questions (Beck, Omanson, & McKeown, 1982; Hansen, 1981). In a comprehension curriculum, we would also want to see questions and activities that ask children to respond to literature as reflections of their lives

and experiences. These activities should be included in a total reading program that focuses not only on comprehension but on reading as an aesthetic experience as well.

How Should Comprehension be Taught?

Now that the question "What should be taught?" has been addressed, we address the question of "How should it be taught?" As such, this part of the report is a search for instructional actions in teaching the comprehension curriculum.

We must establish at the outset, however, that just as the shift in curricular focus from skills to strategies brings with it the capacity for making the reading curriculum more meaningful and compelling for students, the instructional focus should empower students to experience the gifts and rewards of literacy.

Earlier we noted how cognitive research suggests changes in the comprehension curriculum. Similarly, instructional research suggests changes in how to teach it. Traditionally, reading teachers have relied on a practice model; that is, students are repeatedly exposed to tasks, primarily answering comprehension questions and completing skill exercises. In both cases, instructional materials—particularly basal reading textbooks—dominate because teachers look to materials both for what students will practice and what teachers will discuss with students during practice.

Whether the focus is primary grades (Duffy & McIntyre, 1982), middle grades (Durkin, 1978-79), high school (Palmer, 1982), or community college (Herrmann, 1985), teachers follow the dictates of commercial reading materials and emphasize completion of isolated skill tasks prescribed by those materials. Often, the teacher's role is primarily that of a technician who follows directions and prescriptions, rather than that of a decision maker who engages in substantive pedagogical maneuvering in response to students' needs (Duffy, 1982; Duffy, Roehler, & Putnam, 1987).

However, drill-and-practice instructional models are inadequate for our new comprehension curriculum. This is especially true in a technologically sophisticated society—a society that will increasingly value creative problem-solving over mechanical prescription-following. It is no longer good enough to have students answer questions and memorize isolated skill responses. Students must be self-regulated constructors of meaning from text; hence, more flexible, interactive, and problem-focused instructional actions are needed. What follows is a search for those actions.

History of Instructional Research

Until about 1970, instructional research was virtually unknown. Teaching was viewed as a craft, and teachers were "born, not made." However, research such as the Coleman Report (1979), which implied that teachers do not make a difference in student achievement, spurred researchers to examine teacher effects. The result was a body of research called "process-product" research.

Process-Product Research

Process-product research examines instructional acts (processes) of teachers whose students receive high reading achievement scores (products) and compares them with instructional acts of less-effective teachers. Results are generally catalogued as "teacher effectiveness" research. Researchers such as Brophy (1979), Good (1983), Rosenshine (1979), and Rosenshine and Stevens (1984) used process-product research findings to create a list of teacher behaviors associated with high achievement test scores. Many of these behaviors were validated in a frequently cited experimental study in reading (Anderson, Evertson, & Brophy, 1979) in which the effectiveness of first-grade teachers of reading who were directed to use techniques associated with effective teachers were compared with the effectiveness of first-grade teachers who tended not to use these techniques. Results demonstrated that teachers who used such techniques produced significantly better achievement test results than teachers who did not.

This study is one of many (see, for instance, Brophy & Good, 1986) that are sometimes referred to as "direct instruction" research because the results indicated that effective teachers present curricular goals in direct and explicit ways.

Process-product research was significant because it established the simple but important fact that specific teacher actions result in improved student outcomes. However, it was also plagued by three serious weaknesses. First, the criterion for effectiveness was achievement test performance of skill-based tasks in basic reading and mathematics, not the acquisition of self-regulated comprehension strategies (or, for that matter, the problem-solving strategies in mathematics). Second, the research was based on the drill-and-practice model of instruction employed by many teachers and, as such, tended to produce results suggesting how best to employ a drill-and-practice model. It did not determine whether other instructional models might be even more effective. Third, suggestions for how best to employ drill-and-practice focused almost exclusively on time-on-task issues, that is, teacher actions that increase students' time on academic tasks were emphasized.

Ultimately, the major contribution of process-product research was to establish that techniques that increase students' attending behavior during instruction result in improved student achievement. Because getting and holding students' attention is associated with classroom management, the findings spurred efforts to help teachers establish well-managed classrooms. For instance, process-product research is frequently disseminated to teachers in the form of classroom management techniques (Anderson, Evertson, & Emmer, 1980; Brophy & Putnam, 1979; Doyle, 1979).

This is not to say that the process-product research was not important. To the contrary, these early attempts at studying instruction were important for four reasons. First, they established the relationship of good classroom management to instructional effectiveness; it is now almost a given in supervision that good management is a prerequisite to any sort of instruction. Second, the research helped us learn to distinguish classroom management (i.e., getting students on task and keeping them there) and instruction (i.e., helping students build understandings). This distinction was significant because it ultimately led to instructional research that went well beyond getting students on task; in a sense, it permitted the discovery of many of the findings we discuss later. Third, process-product research established the fact that teachers do make a difference, particularly with academically at-risk students. Finally, process-product research demonstrated that the actions of effective teachers are not limited to mysterious, inherited capabilities; instead they include many common-sense techniques that all teachers can use to improve their effectiveness.

A Current View of Instruction

As useful as process-product findings of the 1970s were, they have little application to current comprehension instruction because students need to do more than practice answering questions and completing skill sheets. Several forces caused reading educators to think differently about instruction, and these forces, in turn, led to alternatives to traditional drill-and-practice models of comprehension instruction.

The first force shaping a new view of instruction was the schema-theoretic view of learning from text (Anderson & Pearson, 1984). In the first part of this report we noted the impact of this view on how students comprehend text. However, it also has an impact on our understanding of how students comprehend *instruction*. In the schema-theoretic view, learning from text is an active process of constructing meaning in which old knowledge is connected in sensible ways with new knowledge encountered in text. Readers build meaning by engaging in a series of recursive interactions with text. In instruction, learners build meaning by engaging in a series of recursive interactions with the teacher. Students make predictions about what the teacher will do or say; they build a tentative model of meaning. As they receive new information from the teacher's talk or actions, they either fit it to the existing model or revise the model so that the information does fit. Just as readers reconstruct an

author's meaning during reading, so students gradually reconstruct a teacher's meaning during instruction.

A second force shaping instruction grows directly out of the schema-theoretic perspective. It is called the "cognitive mediational paradigm" (Winne & Marx, 1982). The cognitive mediational paradigm, like the schema-theoretic view, characterizes students as active rather than passive. From this perspective, students are proactive interpreters of instructional cues provided by the teacher, and they make sense of instruction by combining these cues with prior knowledge about both the curricular topic and the ways to survive in that classroom. Shulman (1986) describes it as follows:

> The learner does not respond to the instruction per se. The learner responds to the instruction as transformed, as actively apprehended. Thus, to understand why learners respond (or fail to respond) as they do, ask not what they were taught, but what sense they rendered of what they were taught. The consequences of teaching can only be understood as a function of what that teaching stimulates the learner to do with the material. (p. 17; emphasis added)

The most prevalent cue students use to make sense of instruction is the academic work teachers provide for them to do (Doyle, 1983). "Academic work" is used broadly to mean the conceptual sum of the tasks the teacher assigns and the information the teacher provides about these tasks. For instance, suppose that a teacher wants to teach "main idea" to help students determine what is important in textbooks. To do so, suppose that the academic work she assigns are worksheets requiring students to repeatedly select the best title for short paragraphs. Suppose further that she tells students that their grade will be based not on how they use main idea in textbooks but on their accuracy and neatness in completing the worksheets. Although she may intend for the worksheets to be a stepping stone to real application, students are likely to infer that the real purpose of main idea is to complete worksheets. Further, they are likely to infer that main ideas are something you do to paragraphs or worksheets and not something to do to real text. This is because students, when confronted with school tasks, mediate them. In other words, they negotiate meaning for them much like they mediate meaning for text; they combine incoming information with what is already known, make inferences about what is really intended, and construct meaning that makes sense in terms of their prior experience.

One classic illustration of this mediational process was seen in a study of first-grade reading seatwork (Anderson, Brubaker, Alleman-Brooks, & Duffy, 1985). While all the teachers in the study intended for seatwork on letter-sounds, dot-to-dot drawings, and so on to help students learn how to be better readers, students (particularly low-group students) concluded that the purpose of worksheets was to "get done." Given this academic work (the worksheets assigned each day as seatwork), students' prior knowledge about how things work in their classrooms and about letters and drawing caused them to construct meaning for seatwork that made sense in terms of their prior experiences as students in those classrooms but did not reflect their teachers' intentions. Similarly, while teachers hope that skill activities are academic work that will help students be better readers, students often mediate these activities to mean something quite different (Winne & Marx, 1982). Hence, instruction is heavily influenced by student interpretation of what goes on in the classroom.

A third force shaping current instruction, and one closely related to student mediation, focuses on the teacher's mediational role. Just as students are cognitively active in interpreting what the teacher says and does and, on the basis of these cues, deciding what is really important, effective teachers are also cognitively active. They interpret what students say and do during instruction and, on the basis of how well these interpretations match what they perceive the intended outcome to be, provide students with additional instructional information (Duffy & Roehler, 1987; Roehler & Duffy, 1987). When teachers engage in such activity, they are doing their own kind of negotiation in an attempt to bring student understandings in line with intended curricular outcomes. For instance, if after modeling how to activate background knowledge before reading a teacher notes that her students think they are to use only their prior knowledge (as opposed to combining their prior knowledge with text cues), he must spontaneously

clarify and elaborate upon their perceptions so that students restructure their understandings and alter their inappropriate understandings. For instance, he will provide more examples, models, analogies, and other aids to illustrate how to combine prior knowledge with text cues. This aspect of instruction has been referred to as "alternative representations" (Wilson, Shulman, & Richert, 1987), "responsive elaboration" (Duffy & Roehler, 1987), and "adaptive actions" (Roehler, Duffy, & Warren, 1988).

Fourth, present understandings of instruction are influenced by research on metacognition and metacognitive awareness (Baker & Brown, 1984; Flavell, 1981; Garner, 1987; Garner, in press). As we suggested earlier, this research suggests that expert readers, regardless of their age, can become consciously aware of their own cognition. Moreover, as a result of this awareness, they can monitor and self-regulate their comprehension. Students who are aware of how they make sense of text can regulate sensemaking. Rather than simply answering comprehension questions or completing worksheets, students must also be consciously aware of *how* they answer questions and *how* they employ strategies. This awareness empowers them to access and apply such cognitive processes when needed. For instance, Meloth (1987) concluded that metacognitive awareness of lesson content is a crucial mediating variable between instruction and student application of instruction to outcome measures. As such, awareness is a key to being in control of both comprehension and transfer of learning from one situation to another. This argument stems from the assumption that readers cannot repair or fix-up their comprehension if they are not conscious of these resources and how they work. Consequently, instruction should build students' awareness of what they know so they can consciously call on that knowledge when they encounter similar situations in the future.

Finally, current views of instruction are influenced by the explicit instructional tradition (Duffy, Roehler, Meloth, & Vavrus, 1986; Pearson, 1985). Because students build curricular understandings by combining information provided by the teacher with their prior knowledge, it is reasonable to expect that the more explicit instructional cues there are, the more likely students are to infer teachers' intended curricular goals unambiguously. From another perspective, one can say that explicitness increases the likelihood that the inferences students draw in the process of cognitive mediation will match the intentions the teacher had in mind in the first place. Further, explicitness expedites student metacognitive awareness. When teachers are explicit, students demonstrate significantly greater amounts of metacognitive awareness of lesson content (Duffy, Roehler, Sivan, et al., 1987). Hence, rather than simply providing students with practice alone, teachers must share with students information which they can use to construct understandings about how reading works and then provide practice.

Summary. These five forces suggest that comprehension instruction is a much more complex and fluid process of teacher-student interactions than suggested by drill-and-practice models where the teacher's role is essentially one of directing student attention to tasks. In the new view, the teacher plays a pivotal role in helping students gradually construct curricular understandings. Teachers cannot simply ask comprehension questions and supervise completion of accompanying workbook pages. Instead, their instructional actions also include sharing with students explicit information about how expert readers make sense of text, adjusting that information as instruction proceeds to accommodate students' emerging understandings and awareness.

Shulman (1986) describes this view of instruction as

> transforming [one's] own comprehension of the subject matter, [one's] own skills of performance or desired attitude values, into pedagogical representations and actions. There are ways of talking, showing, enacting or otherwise representing the ideas so that the unknown can come to know, those without understanding can comprehend and discern, the unskilled can become adept. (p. 17)

What are these "pedagogical actions?" What should teachers do to help students take charge of the process of constructing meaning from text?

Searching for an Instructional Plan of Action

As opposed to older views of instruction in which teachers repeatedly exposed students to practice materials, in this new view the teacher is a mediator who negotiates development of student understandings through recursive, reciprocal interactions in which both teacher and students play active roles and in which curricular understandings are gradually developed over time. Elements of this perspective are seen in virtually all significant comprehension instruction research (see, for instance, Duffy, Roehler, Sivan, et al., 1987; Palinscar & Brown, 1984; Paris & Jacobs, 1984; Pearson, 1985). When taken as a whole, the instruction reflected in such research can be described in terms of four kinds of teacher action: planning, providing motivational opportunities, sharing information, and nurturing student understandings.

Planning. Traditionally, teacher planning has been thought to be static; that is, pedagogical actions are planned in advance and then followed much like scripts. However, in our current view, planning is a much more fluid process. Because instruction is a dynamic process, it cannot be entirely planned in advance and then played out faithfully according to the scenario. It *begins* with a plan that states the teacher's intentions regarding the goal and the procedures to be followed. In that form, it *looks* static. However, as soon as implementation begins, the plan is modified. Students create unanticipated meanings that render the plan obsolete. This tension between teacher intentions and student meanings requires the teacher to modify the plan. This recursive process of reciprocal mediation by teacher and students continues until one of three outcomes is realized: (a) the students achieve the goal, (b) the teacher modifies the goal, or (c) time runs out on the lesson. Hence, while planning remains a crucial component of good instruction, it is not a script to follow but a foundation from which teachers make adjustments in response to student mediation.

The selection of academic work to be pursued during any lesson or series of lessons is a crucial part of planning instruction, because academic work is the primary medium through which students make sense of instruction (Doyle, 1983). Academic work in reading provides students with experiences with reading. These become part of the students' prior knowledge about reading and, as such, part of what they use to make sense out of subsequent reading activities.

For instance, let's compare two hypothetical teachers. Suppose the school experiences in Mr. Williams' classroom emphasize academic work involving literature-reading tasks, while the school experiences in Mr. Smith's room down the hall emphasize academic work involving workbook tasks. It is likely that students in Mr. Williams' classroom will view subsequent reading encounters from the perspective that reading is what you do with literature and books and, consequently, will construct one meaning for reading. It is also likely that students in Mr. Smith's classroom will view their subsequent reading encounters from the perspective that reading is something you do with workbooks and, consequently, will construct another, very different meaning for reading than will Mr. Williams' students.

At a more subtle level, academic work also includes the environment defining the context for academic work–what some have labeled the situational context. For instance, a lesson on drawing inferences taught in a classroom emphasizing genuine communication purposes, such as writing letters to order books from catalogs (as opposed to completing worksheets) may cause students to associate what they learn about reading with genuine communication; in contrast, the same inferencing lesson taught in a classroom that routinely emphasizes only such school-related reading tasks as worksheets, may cause students to associate what they learn about reading with artificial school situations. As such, academic work has a powerful influence on the views students develop about reading.

To illustrate the power of academic work, let's look at three different examples of comprehension instruction. Each is effective in developing a different kind of comprehension outcome; in other words, we are not presenting them as examples of good and poor instruction but rather as examples of how different kinds of academic work influence what students learn about comprehension.

One common kind of academic work in comprehension is answering teacher-generated questions about reading selections. Teachers can ask questions based on a systematic analysis of text (see, for instance, Beck, Omanson, & McKeown, 1982; and Ogle, 1986). The academic work in this instance is the answering of comprehension questions about the content of the selection. Students learn about the content of the selection. If the curricular goal focuses on knowledge of a selection's content, this can be a highly effective kind of academic work. For instance, the directed reading lesson, in which questions about a selection's content are asked before, during, and after reading to guide students to meaning, is a good technique if you want students to know the selection's content. The academic work of answering questions about the content helps students conclude that knowing the selection's content is important.

A second kind of academic work in comprehension occurs in the technique of reciprocal teaching (Palincsar & Brown, 1984), an instructional setting in which students and teachers take turns being the teacher and eliciting responses from peers. While participants engage in question asking much as described above, it is different here because students do not simply respond to the teacher's questions; instead, they share equally in dialogues that focus on processing text meaning through predictions, questions, summaries, and clarifications. The academic work here is the dialogue about the activities of predicting, questioning, summarizing, and clarifying. Students learn to actively employ these activities as they process text meaning. The academic work helps students conclude that active processing of text meaning is something expert readers do.

A third kind of comprehension instruction focuses on direct explanation of reasoning employed when using strategies to repair meaning blockages (Duffy, Roehler, Sivan, et al., 1987). Students are provided with the kind of explicit explanations of reasoning that expert readers employ when adjusting predictions to fit new text information, when determining what is important in text, when clarifying information, and so on. The focus is on developing conscious awareness of reasoning so students can regulate the use of such reasoning in future reading situations. When the curricular goals are that students should monitor how they construct meaning, how they activate appropriate strategies when blockages are encountered, and how they remove blockages, this kind of academic work is effective. It helps students conclude that expert readers reason in adaptive, flexible ways when blockages to meaning are encountered.

These three forms of comprehension instruction are all effective, but for different reasons. Because each engages students in different kinds of academic work, each encourages students to think differently about comprehension, and consequently, each causes students to construct different understandings about what strategic readers do. Because all three outcomes are desirable, teachers will want to select one kind of academic work at some times and other kinds at other times.

A teacher may use comprehension questioning when she particularly wants her students to understand a selection's content; she will use reciprocal teaching when her major objective is to help students understand how to be active processors of text, and she will use direct explanation of strategy reasoning when her primary intention is to show students how to reason when comprehension problems are encountered.

Providing motivational opportunities. The environment for reading instruction is optimum when students are enthusiastic about reading and have an I-can-do attitude. Helping students to develop enthusiasm and an I-can-do attitude depends on the two factors of success and usefulness. All humans enjoy being successful and avoid doing things that they won't do successfully. Motivated students are those whose encounters with reading are reasonably successful. Teachers can create instructional lessons where their students are successful if (a) they assess their students' understandings, then provide lesson content that is at the zone of proximal development (Vygotsky, 1978), (b) if they set reasonable expectancies (Brophy & Good, 1986), and (c) if they help students develop self-regulated approaches to learning (Book, Putnam, Meloth, & Sivan, 1988; Sivan & Roehler, 1986).

Students will be provided with opportunities for success when assessment and instruction are given within the zone of proximal development. This involves giving students information and asking them to act upon that information at a level where they can complete the task with assistance but cannot complete it without assistance. When students complete a difficult task with assistance they experience feelings of success. Success with difficult tasks leads to the development of the I-can-do attitude and feelings of enthusiasm.

A second way to provide success is to set reasonable expectations. Teachers can use reasonable expectations to create an environment that is motivating. Brophy (1986) has shown that reasonable expectations can be set when teachers' instructional actions support student efforts, assign appropriately different tasks, specify how learning is useful, and most important, model learning as rewarding, self-actualizing activity.

Finally, helping students become successful can occur by developing self-regulated approaches to reading. This can be accomplished when teachers provide instructional talk that signals to the students that they are responsible for monitoring and cannot rely on an external monitor, such as the teacher. Sivan and Roehler (1986) found that in comparison to teachers who did not provide such talk, teachers who signaled student responsibility in their lessons helped students develop internal motivation and an I-can-do attitude. Book, Putnam, Meloth, and Sivan (1988) found that teacher statements about self-regulation were highly related to student awareness of the need to be self-regulating. Therefore, teachers who want to help students become self-regulated and possess I-can-do attitudes that lead to success can do so by adding statements to lesson discussions about students being in control of their own learning.

In summary, teachers who want to develop feelings of success in their students can do so by assisting students with difficult tasks, creating reasonable expectancies, and supporting self-regulated learning.

Usefulness is the second factor that develops enthusiastic readers who possess I-can-do attitudes. Understandings of the usefulness of reading strategies can be greatly enhanced when students are provided with instructional talk that explicitly explains when strategies can be used (Brown, Bransford, Ferrara, & Campione, 1983; Duffy & Roehler, 1989; O'Sullivan & Pressley, 1984; Paris, Lipson, & Wixson, 1983). Several experiments have shown that adding statements about when or why to use strategy knowledge to instructional tasks increases the likelihood that strategies will be used following instruction (Borkowski, Levers, & Gruenenfelder, 1976; Cavanaugh & Borkowski, 1979). Post hoc analysis of experimental data about teacher explanations suggests that teachers' statements of why or when to use strategies may contribute more to students' success than statements of either what is being learned or how to do it (Meloth & Roehler, 1987). Usefulness statements of when or why to use strategies is a helpful addition to teachers' strategy lessons.

Sharing information. Instruction is designed to help students build understandings—or schemata—for curricular goals. Experience is the fuel for schema development. This is true whether the schema in question is for a dog, a fancy restaurant, a comprehension strategy, or a teacher's mode of instruction. Furthermore, it is not experience, per se, that matters, but experience that provides helpful information. It is not enough to just see a collection of dogs. One must see an array of dogs in juxtaposition with an array of non-dogs (for example, cats, wolves, horses, coyotes) or accompanied by some explanation of key features to look out for (fur, snout, bark, sloppy tongue, and the like). Similarly, for students to develop a schema for a strategy, such as summarizing, they need to encounter lots of opportunities to summarize as well as some explanations of the key features of a summarizing activity.

Two conditions govern our view of this interchange of information. The first relates to the kind of information teachers provide early in a lesson. When a lesson begins, students may lack an adequate schema for the curricular goal at hand, or worse, they may possess misconceptions about it. Thus we might teach a lesson on how to monitor meaning-getting because students lack a schema for what one does to monitor or because they have a misconception about how to do so. In order to create or modify

schemata about monitoring, we might provide helpful hints about how to monitor meaning; students might then use that information to create or modify their schemata about how to make sense of text.

The second condition governing information sharing is teacher modeling. Modeling, physically demonstrating performance of a task, is a frequently recommended technique in a variety of instructional approaches (Good, 1983; Rosenshine, 1979). Modeling is what teachers do when they silently read their own library book during Uninterrupted Sustained Silent Reading (USSR) or when they show students how to complete a worksheet. However, the advent of the new comprehension curriculum encourages a more specific meaning for modeling in which teachers not only demonstrate physical aspects of reading but, to one degree or another, they also explain the invisible mental reasoning involved in performing tasks. The effectiveness of this kind of modeling depends upon three factors. The first is the explicitness of demonstrations (Duffy, Roehler, Sivan, et al., 1987; Pearson, 1985; Pearson & Dole, 1987); demonstrations that provide explicit, unambiguous information are more effective than those which are vague or jumbled. The second is flexibility of the demonstration; demonstrations must communicate that cognitive processing is a matter of flexible adjustment to cues provided in the text or the situation rather than rigid adherence to rules or procedural steps. The third is specificity; to develop student metacognitive control of the cognitive process, teachers must model the invisible mental processing involved. If the teacher merely asks questions without explaining the reasoning one employs to answer the questions, for instance, students have difficulty assuming control of the comprehension process; the reasoning employed by the teacher remains a mystery and the comprehension processes used by students remain unsatisfactory (Bereiter, 1986; Duffy, Roehler, & Herrmann, in press).

Nurturing student understandings. Once teachers share information about how to comprehend, they must be prepared to nurture students' mediation of the strategy. Students do not passively receive instructional information; they interpret it. Depending upon their prior understandings about reading and the explicitness of the teacher's information sharing, students' interpretations will be more or less representative of the intended curricular outcome. For instance, a teacher may have students complete a self-questioning activity with the intention that they will engage in deeper levels of thinking; however, students may interpret the activity to be something to do only when the teacher is present to enforce compliance. While academic work and explicit information can minimize discrepancies such as this, there is almost always some discrepancy. Consequently, teachers must monitor students' evolving understandings as lessons progress and provide elaborated information (feedback) to help students modify their understandings (Duffy & Roehler, 1987). To illustrate, if students misinterpret a self-questioning activity as described above, the teacher will spontaneously create situations designed to help students redefine their understanding. For instance, the teacher might have students work in pairs and then gradually move to working alone.

Helping students redefine their understandings as lessons progress is a subtle instructional enterprise. It requires that teachers use student responses as "windows into the mind," to infer from these responses the quality of student understanding and, on the basis of this assessment, spontaneously devise essential instruction—scaffolding, cueing, prompting, analogies, metaphors, questioning, elaborations, and re-modeling—which provide students with elaborated information to use in restructuring understandings. Further, depending on how close the student is to the desired outcome, these spontaneous elaborations are more or less specific. That is, as students move from what Vygotsky (1978) calls "other-directed to self-directed stages," teachers socially mediate this progression by gradually diminishing the assistance provided. Early in the learning, teachers offer quite explicit and detailed help; gradually they diminish the amount of assistance as students began to construct the curricular goals. This progression has been referred to by Pearson (1985) as the "gradual release of responsibility," because teachers assume much of the responsibility for building student understandings early in lessons but, as lessons progress, students assume more and more of that responsibility. This process of making the shift from teacher control to student control is a crucial, but very subtle, instructional action.

Helping students restructure their understandings is not limited to lesson-specific actions, however. Effective teachers also engage in a similar progression across longer periods of time (Roehler & Duffy,

1987). For instance, teachers look for opportunities to help students build understandings about the global nature of strategic reading, the interrelationship among strategies, the adaptation of strategies and the combining and re-combining of strategies. These understandings are not lesson specific; that is, they do not focus on a strategy being taught on a given day. Instead, they cut across individual lessons and focus on wholistic concepts about reading and language. This redefining of students' broad conceptual understandings about strategic reading also represents a "gradual release of responsibility" when the release occurs over long periods of time rather than within the period of a single lesson.

Summary. Instruction can be characterized as a situation in which teachers attempt to make learning sensible and students attempt to make sense of learning. Both teachers and students negotiate instructional meaning.

Teachers plan the understandings they want to create and select appropriate academic work to create instructional opportunities, they provide motivational opportunities, they share information, and they nurture students' understandings in ways designed to help students construct intended curricular goals; students interpret academic work and information in light of their prior knowledge about reading and of the rules governing life in classroom. These important instructional actions help students interpret academic work accurately and move closer and closer to intended curricular goals.

What Does This All Mean for Classroom Instruction?

In a drill-and-practice model of instruction, practice in answering comprehension questions and in completing skill tasks drives instruction. The logic is that if students practice enough of those tasks, they will eventually develop something called the ability to read. A number of forces have brought this model into question. From a curriculum perspective, we now know that mastery of long lists of comprehension skills has very little to do with the development of expert reading. From an instructional perspective, we now know that students comprehend instructional information by using their prior knowledge and new information from the instructional experience to construct schemata for curricular goals. If they are to learn how to be strategic readers, they must participate in instructional experiences which lead them to construct understandings consistent with what expert readers actually do.

Creating such instructional experiences requires teachers to move well beyond managing assignments. Teachers must decide whether the academic work they assign promotes student thought about the intended outcome, they must provide information which will help students construct understandings about that outcome, and they must spontaneously elaborate as they observe students refining their understandings. Very little is fixed in this instructional milieu; teachers' instructional actions depend almost totally on what students know and how students respond to instructional experiences.

Teachers cannot simply follow the directions in instructional materials. They must assume regulatory control over materials rather than be controlled by them, in much the same way that teachers try to get students to take metacognitive control of their reading comprehension. Teachers have to regulate instruction by adapting prescriptions, suggestions, commercial materials and recommended techniques to particular students and groups of students and by adjusting their plans for any given lesson to emerging student understandings.

Teacher metacognitive control of instruction is crucial for two reasons. First, infusing instruction with vitality and zest is a highly personal endeavor. Really, it is both a personal and an interpersonal endeavor. Teachers and students create the electricity, the spontaneous spark which cannot be prescribed in advance by even the most thoughtful of authors or editors. Second, students construct instructional meanings throughout the flow of instruction. Hence it is impossible to prescribe in advance how instructional experiences should be structured or restructured. Teachers must be free to create these responses "responsively."

The bottom line is pretty straightforward. Teachers begin the process with fairly well-planned intentions; they decide what to teach and what academic work to assign. Along the way they provide opportunities for motivation, they share key information, and they respond in whatever ways are necessary to nurture student understandings. And it is in this nurturing process that teachers must summon up all their flexibility, adaptability, and problem-solving skill just to keep pace with the wondrous and varied understandings that students bring to and take from the instructional experience.

A Caveat

Just as we do not want our search for a comprehension curriculum to be used exclusively and inclusively, we do not want our search for instructional actions to be viewed as the final word. In fact, we have resisted the temptation to describe an "instructional model" for fear that such a label implies a static set of teaching procedures to be followed rigidly when the truth is that effective instruction demands fluid and flexible teacher adjustment to student understandings.

Further, other instructional issues remain to be addressed. While we argue that it is not enough to limit comprehension instruction to random asking of comprehension questions and to completion of skill sheets in a drill-and-practice mode, we are not saying that teachers should never ask questions, never assign worksheets or never require practice. To the contrary, it is difficult to imagine instructional interactions that do not include questions. No matter how you disguise it, independent work is probably going to end up looking a lot like worksheets. Also, while we argue that teachers cannot rigidly follow prescriptions in instructional materials in thoughtless ways, we anticipate that instruction will involve the use of commercially published materials designed to ease teachers' burdens. Also, while we emphasize *teacher* instructional actions, our emphasis on student mediation hopefully makes clear that instructional techniques focusing on *student* actions, such as cooperative learning (Slavin, 1980), are also important. And finally, while we talk about the actions of expert teachers, it is clear that expert teaching, like expert reading, develops in a novice-to-expert continuum. Just as students gradually develop reading strategies, so teachers gradually develop expertise in carrying out instructional actions. However, discussion of these issues has not been our purpose here.

Instead, our purpose has been to identify those instructional actions documented to be effective in recent research, to organize them into a coherent framework, and to contrast them with existing practices. As more is learned about effective instruction, refinements and elaborations will be made on these principles. However, they represent a start which teachers can use to begin moving from a traditional drill-and-practice model of reading instruction to one which is more compatible with what we know about reading and learning as strategic cognitive processes.

Rules of Thumb

We close this essay on reading comprehension instruction with a set of "rules of thumb" about what to teach and how to teach it. There should be no surprises here; instead the rules should represent natural extensions of what we have discussed so far.

- **We need a few well-taught, well-learned strategies.** Currently, there are too many skills to teach in most reading curricula. Pressured by so much to cover in so little time, teachers adopt a strategy of mentioning everything; in the process, they have no time to teach anything very well. Everyone involved—teachers, students, parents—would benefit from a comprehension curriculum that was "lean and mean," a curriculum composed of a handful of key strategies taught well and applied to real texts frequently.

- **Reading develops as a process of emerging expertise.** Reading is not best learned as a set of isolated skills, picked up one-by-one along an "assembly line" offered by the teacher and/or the reading program. Instead there is a single central goal, building meaning, that recurs from one situation to the next. What changes over time is the level of sophistication of the student's expertise and the amount of conceptual and contextual support teachers need to provide. Teachers would be better off to regard their role as journeymen readers working with knowledgeable and purposeful apprentices rather than as purveyors of truth.

- **Good reading strategies are as adaptable as they are intentional.** Reading strategies begin as conscious plans that readers use to make sense of text. They are intentional--readers have in mind a few predetermined ideas about how to go about building meaning. But reading strategies are also adaptable--they can and should change quickly and easily depending upon how readers size up the situation at hand. Good readers change what they do depending upon their perceptions about the text, the task, the purpose, and the consequences of reading.

- **Good reading instruction is as adaptable as it is intentional.** Teachers begin instruction with some intentions, usually curricular goals--understandings about what reading is and how it works--that they want students to achieve. But they realize that they have to adapt their goals and their strategies based upon their students' and their own emerging and dynamic understanding of the instructional situation.

- **Good reading instruction depends upon the creation of an environment that continually portrays the usefulness and value of reading.** Good instruction includes an environment conducive for learning where the usefulness of reading is constantly seen. Students who interact daily with print, read what others have written, and write to others develop conceptual understandings about the value of reading. Reading is seen as a tool for gaining new knowledge and rethinking current knowledge.

- **Good reading instruction involves opportunities for students to activate their background knowledge,** to discover new information, and to construct new understandings. In order for optimum learning to occur, students should think about what they already know about a topic, be presented with new information, and through the mediation process gradually come to understand the topic of the lesson. Students who are not helped in learning strategies used in these three areas usually have difficulty when reading material that is difficult, and consequently they learn less.

- **Good reading instruction involves careful scaffolding** that allows students to use a strategy before they fully understand it while they gradually gain control of it. With analogies, explicit cues, redirecting, metaphors, elaborations, and modeling, teachers can create a form of assistance that allows students to complete the task before they cognitively understand how to do it and when to apply it. This form of assistance is highly productive as long as the scaffolding is gradually removed as students gain control of the task.

- **Good reading instruction involves the development of broad conceptual understandings about reading and more specific understandings about how, when, and where to use strategies. It is difficult to simultaneously develop specific understandings and global understandings about reading. It is somewhat like the creation of a tapestry where specific patterns must be understood and used in order to understand and create the whole design. During the creating process, the specific patterns should be carefully attended to, but as the finished product emerges, it is the whole tapestry that is enjoyed, understood, and used. The specific patterns become a way for the whole tapestry to be seen and understood. While this is difficult to achieve, it is necessary to do so if the appropriate understandings for reading are to be developed.**

- **Both reading comprehension and comprehension instruction are highly interactive and reciprocal. The meanings that students create for the texts they read are complex negotiations involving an unseen author, a teacher, and an interpretive community of peers with whom to share and revise meanings. The meanings that students develop about their instructional situations (their instructional texts) involve similarly complex negotiations among self, teacher, peers, and the situation itself. Teachers and students provide one another with demonstrations of how to build, share, and revise models of meaning, both of the texts they read and the instruction they are trying to render sensible.**

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Author Note

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Table 1

Whole Text

Beryl Markham lived in Africa more than 50 years ago, when people were just beginning to fly airplanes. There were no airports or control towers. Planes had one engine and no radio or heat. Yet she flew her tiny plane to many faraway villages, carrying mail, supplies and sometimes passengers.

What was this story about?

Sentence 1

Beryl Markham lived in Africa more than 50 years ago, when people were just beginning to fly airplanes.

Emily - Expert Adult Reader

Thoughts: Okay, this is about a woman (strange name --Beryl?)--could be a man I suppose--anyway this person lived in Africa--reminds me of Isak Dineson--I wonder if they knew each other--she lived in Africa then too. Rest of sentence makes me think Beryl will fly a plane or be in one or something like that.

Comments: Reader is active--uses background knowledge to connect to new knowledge in text--develops hypotheses about the content of the upcoming text.

Gary - Good 5th Grade Reader

Thoughts: What I'm thinking is that what would he be doing, and how we would react to planes because they are so new. And I would also be thinking why would someone live in Africa for 50 years. Until airplanes came out.

Comments: Reader is active--uses background knowledge to connect to new knowledge in the text--asks questions rather than develops hypothesis--but is seeking more information from text.

Albert - Average 4th Grade Reader

Thoughts: There are airplanes flying around . . . jungles

Comments: Reader less active than other two readers. Has difficulty developing hypothesis, asking questions. Responds literally to the text--connects new knowledge to old--jungles--in a limited sense.

Sentence 2

There were no airports or control towers.

Emily - Expert Adult Reader

Thoughts: Of course, this makes sense! Not 50 years ago. I know that! But what about Beryl?

Comments: Reader is active again--new knowledge in text neither adds to nor deletes hypotheses--reader looking for new knowledge to confirm or disconfirm hypotheses.

Gary - Good 5th Grade Reader

Thoughts: I think it would be a little bit hard to fly a plane, because there is nobody to tell you where you should land, how actually and you wouldn't really be able if you fly a far distance. It would be hard to contact back from where you started in the first place so you would have to bring a compass.

Comments: Reader is again active--new knowledge in text is again related to old knowledge--reader drawing inferences about difficulty of flying.

Albert -Average 4th Grade Reader

Thoughts: Bare fields. Looks like bare fields with airplanes landing on it

Comments: Reader developing visual representation of text--draws inferences, contradicts with old information, doesn't seem to be concerned.

Sentence 3

Planes had one engine and no radio or heat.

Emily - Expert Adult Reader

Thoughts: Right, I know that. What about Beryl?

Comments: Reader is impatient for new knowledge--instead of old additional knowledge she already knows.

Gary - Good 5th Grade Reader

Thoughts: Well, since he had one engine I would think he wouldn't go very fast, no radio so if crash and um getting ready to crash definately not going to be able to tell anybody. And if flying in the winter no heat than he will get froze.

Comments: Reader again active--drawing inferences about speed of plane, getting help if needed and freezing in winter--drawing text-based inferences.

Albert - Average 4th Grade Reader

Thoughts: People wearing heavy coats and gloves--because they don't get any heat--cause they might get cold and it's cold up there.

Comments: Reader draws inferences from information in text, uses old knowledge to connect to new knowledge.

Sentence 4

Yet she flew her tiny plane to many faraway villages, carrying mail, supplies and sometimes passengers.

Emily - Expert Adult Reader

Thoughts: Okay, now I get it. That's what I expected--she flew an airplane! Amazing that a woman would do that--very dangerous. I'd never have the courage to do that. And so long ago.

Comments: Reader confirms existing model or hypothesis with new knowledge from the text. Reader draws inferences--connects new knowledge to old--reacts and responds personally to ideas in the text.

Gary - Good 5th Grade Reader

Thoughts: That's pretty nice, because you know a little while ago when there weren't many airplanes then that was the fastest way to travel, and I think it still is. I think it was pretty nice to take people. and mail especially. And supplies to other places.

Comments: Reader again active--but doesn't seem to connect this portion of text to earlier sentences. Comments sentence-related, but not hypothesis-related.

Albert - Average 4th Grade Reader

Thoughts: Plane carrying mail and stuff just a few passenger, not a whole bunch of them.

Comments: Reader literally recalls information in text--no inference drawn here--also no carryover from earlier information in the text.

Question

What was this story about?

Gary - Good 5th Grade Reader

Thoughts: Tells about a person who owned an airplane, when people had just begun to fly airplanes that person around an airplane and carrying mail supplies and passengers to villages and what the plane had, didn't tell what kind of plane it was, but told what the plane had what the person who owned it did.

Comments: Notice how--despite local level inferences drawn--reader develops overall understanding of the paragraph.

Albert - Average 4th Grade Reader

Thoughts: They're different from here because they don't got any airports and control towers and they only got one engine--they might not last longer in the air.

Comments: Notice the focus on a few details from the selection.